Claims

We claim:

1. A printed circuit board, comprising:

a substrate having a dielectric constant different from the dielectric constant of free space;

at least two microstrip lines routed adjacent to one another on a surface of the substrate, each microstrip separated from a ground plane of the printed circuit board by the substrate; and

a dielectric coating applied to at least one of the microstrip lines such that the dielectric constant of the dielectric coating differs from the dielectric constant of free space, and such that the dielectric coating is applied to the at least one microstrip line in a thickness at least half the thickness of the substrate separating the microstrip line from the ground plane.

2. The printed circuit board of claim 1, wherein the dielectric constant of the dielectric coating varies from the dielectric constant of free space in the same direction as the dielectric constant of the printed circuit board differs from the dielectric constant of free space.

3. The printed circuit board of claim 1, further comprising one or more signal sources driving the at least two microstrip lines.

4. The printed circuit board of claim 1, further comprising one or more connection points for driving signals onto or for receiving signals from the microstrip lines.

5. The printed circuit board of claim 1, wherein the dielectric coating is applied by increasing a thickness of a conformal coat applied to the circuit board over the

first microstrip line relative to the average conformal coating thickness applied to the printed circuit board.

6. The printed circuit board of claim 1, wherein the dielectric coating has a dielectric constant approximately the same as the dielectric constant of the printed circuit board.

7. A memory module, comprising:

a printed circuit board;

at least one memory integrated circuit mounted to the printed circuit board;

at least two microstrip lines routed on a surface of the printed circuit board, each microstrip line separated from a ground plane of the printed circuit board substantially by a thickness of printed circuit board material; and

a dielectric coating applied to at least one of the microstrip lines such that the dielectric constant of the dielectric coating differs from the dielectric constant of free space, and such that the dielectric coating is applied to the at least one microstrip line in a thickness at least half the thickness of the printed circuit board material separating the microstrip line from the ground plane.

8. The memory module of claim 7, further comprising at least one connection point for electrically connecting the memory module to other circuitry.

9. The memory module of claim 7, wherein the dielectric coating comprises a printed circuit board conformal coating material.

10. The memory module of claim 7, wherein the dielectric coating is applied by increasing a thickness of a conformal coat applied to the circuit board over the first microstrip line relative to the average conformal coating thickness applied to the printed circuit board.

11. The memory module of claim 7, wherein the dielectric coating comprises a material having a dielectric constant greater than one.

12. The memory module of claim 7, wherein the dielectric coating comprises a material having a dielectric constant approximately equal to the dielectric constant of the printed circuit board.

13. A microstrip line assembly, comprising:

a first microstrip line routed on a substrate, the substrate separating the first microstrip line from a ground plane;

a second microstrip line routed on the substrate; and

a dielectric coating applied to the first microstrip line such that the dielectric coating has a dielectric constant different from that of free space, and such that the dielectric coating is applied to the at least one microstrip line in a thickness at least half the thickness of the substrate separating the microstrip line from the ground plane.

14. The microstrip line assembly of claim 13, wherein the substrate comprises a printed circuit board comprised of fiberglass, and having a dielectric constant of between four and five.

15. The microstrip line assembly of claim 13, wherein the dielectric coating comprises a material having a dielectric constant approximately equal to the dielectric constant of the substrate.

16. The microstrip line assembly of claim 13, wherein the dielectric coating is applied by increasing a thickness of a conformal coat applied to substrate over the first microstrip line relative to the average conformal coating thickness applied to the substrate.

17. The microstrip line assembly of claim 13, wherein the dielectric coating is applied in a thickness designed to approximately minimize propagation delay difference between the first and second microstrip lines when the signal phase of the microstrip lines is varied.

18. A method of reducing propagation delay variation in a microstrip line, comprising:

applying a dielectric coating to at least a first microstrip line routed near a second microstrip line, wherein the first microstrip line is separated from a ground plane by a substrate and such that the dielectric coating is applied to the at least one microstrip line in a thickness at least half the thickness of the substrate separating the microstrip line from the ground plane.

19. The method of claim 18, wherein the dielectric coating is applied by increasing the thickness of a conformal coating material applied to a substrate of the microstrip line over the first microstrip line relative to the average conformal coating thickness applied to the substrate.

20. The method of claim 18, wherein the dielectric coating is applied over the first microstrip line in a thickness such that propagation delay variation is approximately minimized.

21. The method of claim 18, wherein the dielectric constant of the dielectric coating is greater than one.

22. The method of claim 18, wherein the dielectric constant of the dielectric coating is approximately equal to the dielectric constant of a substrate comprising a part of the microstrip line.

23. A method of fabricating a microstrip line assembly, comprising:

forming a first microstrip line on a surface of a printed circuit board, the first microstrip line separated from a ground plane substantially by a thickness of printed circuit board material;

forming a second microstrip line on the surface of the printed circuit board near enough to the first microstrip line that the first and second microstrip lines electrically affect one another when carrying electrical signals; and

coating at least the first microstrip line with a dielectric coating, the dielectric coating operable to change the effective dielectric constant as seen by an electrical signal traveling through the first microstrip line, and such that the dielectric coating is applied to the at least one microstrip line in a thickness at least half the thickness of the substrate separating the microstrip line from the ground plane.

24. The method of claim 23, wherein the first microstrip line and the second microstrip line are near enough that the microstrip lines capacitively couple to each other.

25. The method of claim 23, wherein the first microstrip line and the second microstrip line are near enough that when carrying electric signals an electric field of the second microstrip line influences an electric field of the first microstrip line.

26. The method of claim 23, wherein the dielectric coating has a dielectric constant greater than one.

27. The method of claim 23, wherein the dielectric coating has a dielectric constant approximately equal to the dielectric constant of the printed circuit board.

28. The method of claim 23, wherein the first and the second microstrips are coated with the dielectric coating.

29. The method of claim 23, wherein the dielectric coating is applied by increasing a thickness of a conformal coat applied to the circuit board over the first microstrip line relative to the average conformal coating thickness applied to the printed circuit board.

30. A method of reducing far-end crosstalk in a microstrip line assembly, comprising:

coating at least a first of a first and second microstrip line with a dielectric coating, the first and second microstrip lines physically located such that the electric field from the second microstrip line influences the electric field from the first microstrip line when the microstrip lines are carrying electric signals, the first microstrip line separated from a ground plane by a substrate, wherein the dielectric coating has a dielectric constant greater than one, and wherein the dielectric coating reduces the far-end crosstalk between the first and second microstrip lines, and further such that the dielectric coating is applied to the at least one microstrip line in a thickness at least half the thickness of the substrate separating the microstrip line from the ground plane.

31. The method of claim 30, wherein the dielectric coating is applied in a thickness that approximately minimizes far-end crosstalk between the first and the second microstrip lines.

32. The method of claim 30, wherein the microstrip line assembly comprises microstrip lines on the same surface of a printed circuit board.

33. The method of claim 30, wherein the dielectric coating comprises increasing the thickness of a printed circuit board conformal coating over the first microstrip line relative to the average conformal coating thickness applied to the printed circuit board.

34. The method of claim 30, wherein the dielectric coating comprises a material having a dielectric constant approximately equal to the dielectric constant of a substrate material of the microstrip lines.